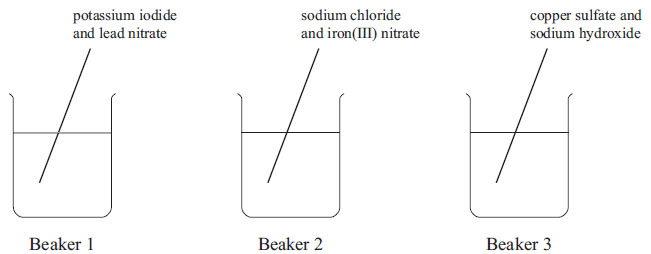
**Precipitation**

**1)** Various solutions were mixed in three separate beakers. Only two of the mixtures produced precipitates.



Identify the name, formula and colour of any precipitate that may have formed in the beakers

Justify the formation, or lack of formation, of precipitates in each of the three

beakers.

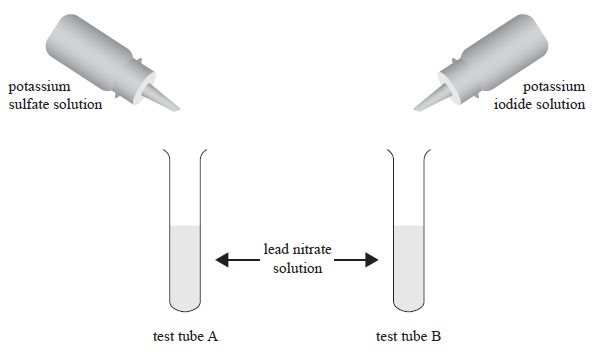
In your answer you should:

 identify the ions present in each solution before they are mixed

 explain why precipitates form or do not form

 write a balanced ionic or symbol equation for each of the precipitates formed.

**2)** An experiment in a school laboratory involves adding colourless solutions together as shown in the diagram below.



Analyse the reactions that occur in test tube A and test tube B.

In your answer:

 record any observations you would make, and link these observations to the

products formed in each reaction

 identify the type of reaction occurring in test tube A and test tube B, and

justify your choices

 write a balanced ionic equation for each reaction.

**3)** The water in a swimming pool contains chloride ions as a result of adding chlorine to help keep the water safe to swim in.

Outline how you could test that there are chloride ions in the swimming pool. You may use the solubility rules provided in the resource booklet. In your answer you should:

 describe what you would do to test for chloride ions

 identify the type of reaction and explain how this reaction helps identify the chloride ions

 describe all observations and link these to the chemical species involved

 write a balanced **ionic** equation for the reaction.

**4)** A chemical reaction occurs when a solution of calcium nitrate is added to a solution of sodium hydroxide.

Analyse this reaction by:

 describing any observations that would be made

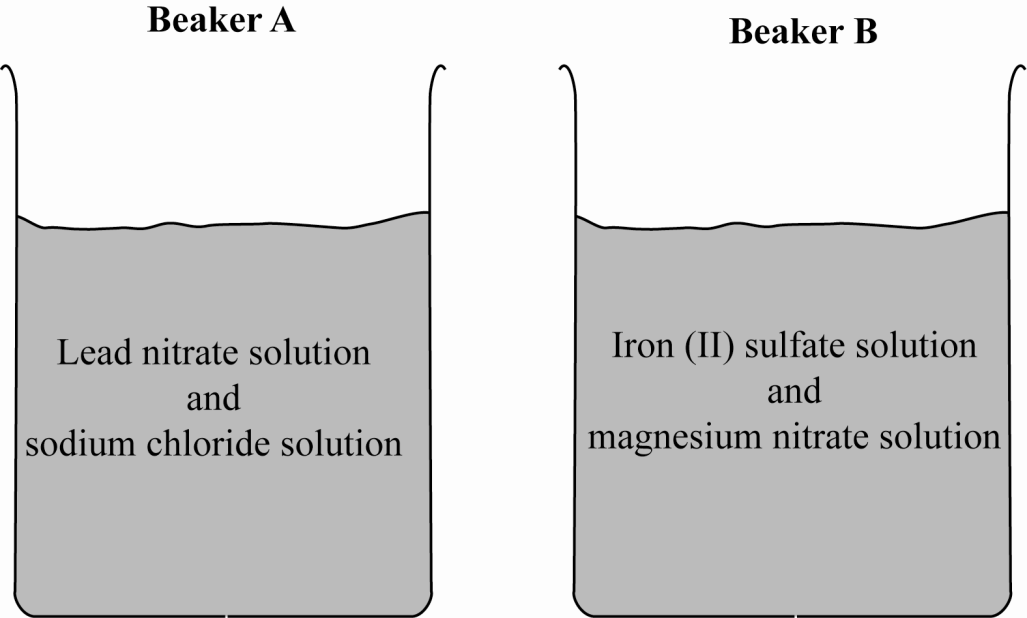
 identifying the products

 explaining what happens to EACH ion that is present in these two solutions

 writing a balanced symbol equation for this reaction.

*(Spectator ions may be omitted.)*

**5)** Two solutions are mixed in one beaker and two different solutions are mixed in another beaker, as shown in the diagram below. A precipitate forms in one of the beakers.

****

Identify the beaker in which a precipitate would form and justify your choice. In your answer, you should:

state which beaker the precipitate would form in

name the ions present in that beaker before they are mixed

name the precipitate formed (use the solubility rules in the resource booklet)

write a balanced symbol equation for the precipitation reaction

fully explain why no other precipitate will form in that beaker.

**6)** When a fresh solution of iron(II) sulfate is added to a solution of potassium

carbonate, a precipitate forms.

FeSO4(*aq*) + K2CO3(*aq*) → ?

Discuss the process of this precipitation reaction. In your answer:

 State any observations you would make.

 Explain what happens to **each ion** present in the solutions used in this

reaction.

 Write the name or formula of the precipitate formed.

 Write a balanced equation (spectator ions may be omitted).

**7)** Discuss what happens when a solution of potassium hydroxide is added to a solution of calcium nitrate.

KOH(*aq*) + Ca(NO3)2(*aq*) → ?

In your answer:

 describe the observations you would make

 predict the products that will form

 explain what happens to **each ion** present in the solutions used in this reaction

 write a net ionic equation for the precipitation reaction.

**8)** Each of the following equations shows what could happen when two solutions are mixed in a beaker.

Reaction 1 Pb(NO3)2 + 2NaCl → PbCl2 + 2NaNO3

Reaction 2 FeSO4 + Mg(NO3)2 → Fe(NO3)2 + MgSO4

Use the solubility rules in your Resource Booklet to identify which reaction would form a precipitate.

Justify your answer by:

 identifying the ions present in each solution before they are mixed

 identifying the precipitate formed when the solutions are mixed

 explaining why that precipitate forms

**9)** The following pairs of solutions are mixed. Use the solubility rules in your Resource Booklet to identify if a **precipitate** is formed.

(a) Write the **name of the precipitate**. If none is formed, write **no precipitate.**



Write a balanced equation for the formation of ONE precipitate identified in (a) above. Spectator ions may be omitted from ionic equations.

**10)** lead nitrate + potassium chloride ---> +

**11)** A colourless solution of barium nitrate is added to a pale green solution of iron(II) sulfate in a beaker. A reaction occurs.

(a) Describe the observations that would be expected for this reaction.

(b) State what type of reaction is occurring.

(c) Discuss the chemistry of this reaction. Your discussion should refer to the observations you made in part (a). Include a balanced equation in your answer. Spectator ions may be omitted.

**12)** The following solutions are mixed in the pairs shown. Use the solubility rules in your Resource Booklet to identify the **precipitate** (if any) that is formed for each pair.

(a) Write the **name of the precipitate** or, if none is formed, write **no precipitate.**



(b) Write a balanced equation for the formation of ONE precipitate identified in Question Two (a) above. Spectator ions may be omitted from ionic equations.

**13) (a)** The following pairs of solutions are mixed. Use the solubility rules in your Resource Booklet to identify the **precipitate** (if any) that is formed. Write the **name of the precipitate** or, if none is formed, write **no precipitate.**



(b) Write a balanced equation for the formation of ONE precipitate identified in Question Two (a) above. Spectator ions may be omitted from ionic equations.

**14)** Complete the table below by writing the **name of the precipitate**, or **no precipitate** if one is not formed.

|  |  |  |
| --- | --- | --- |
|  | **Solutions that are mixed** | **Name of precipitate, or**  **no precipitate** |
| (a) | magnesium sulfate and calcium nitrate |  |
| (b) | lead nitrate and sodium chloride |  |
| (c) | potassium carbonate and zinc sulfate |  |

**15)** Complete and balance the following equations:

(a) CaCl2 (*aq*) +  → CaSO4 (*s*) + NaCl (*aq*)

(b) Cu(NO3)2 (*aq*) + NaOH (*aq*) →  + 

**16)** A solution of **sodium hydroxide** is added to a solution of **iron (III) chloride**.

(i) Describe ONE observation that would be made:

(ii) Write a balanced equation for this reaction:

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